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EXAMINER

BROWN II, DAVID N

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 15, 16, 18, 19, 21-24, 26, 27, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,772,905 (Chou) in view of US 3,502,761 (Dimitracopoulos), and US 5,993,189 (Mueller).

Claim 15:

Chou teaches a device for transferring a pattern of micro- and nanostructures to an object, (abstract) said object having a first surface and a second surface, (every object has a first and second surface) said device comprising a first contacting means (12) having a first stamp adapted to imprint a first pattern in the first surface of the object, (10) and a pressing means adapted to press the first stamp into contact with the first surface of the object in a pressing direction (54), an alignment means arranged in connection with the first contacting means for controlling the motion of the first stamp in a direction perpendicular to the pressing direction (58), and a second contacting means (18).

Chou does not teach a second stamp adapted to imprint a second pattern in the second surface of the object, and the pressing means further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing

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direction, wherein a heat transmission barrier is arranged between the first contacting means and the pressing means to minimize heat transfer there between.

Dimitracopoulos teaches a method of forming micro-structures into an object (column 1 lines 35-40, column 2 lines 32-44, column 3 lines 44-48). The apparatus of

Dimitracopoulos has a second stamp and is adapted to imprint a second pattern in the surface of the object; the pressing means is further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction

(figure 3, ...pair of matching dies, column 4 lines 10-19..two sided pattern, claim1). Both

Chou and Dimitracopoulos teach a pressing operation which presses a pattern of microstructures into a product. The specific elements of the two inventions, the platens, the stamps, and the patterns, are all known. The difference between the inventions is that Chou provides one pattern while Dimitracopoulos provides two. This being the case, all that would have to be done is to place a pattern on both stamps of Chou. This was performed by Dimitracopoulos. When the inventions are combined, the result is predictable: a two-sided pattern will be produced onto the product. It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Chou as Dimitracopoulos. This amounts to the combining of prior art elements according to known methods.

Chou teaches the use of heat in such an imprinting operation - (Chou claim 3). Muller teaches a pressing device adapted to press a pattern of microstructures on a substrate (column 2 lines 16-21). Muller also teaches the use of a heat transmission barrier (column 2 lines 10-15). Muller includes the heat transmission barrier in order to restrict

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heat transfer to the neighboring components of the apparatus (column 3 lines 7-13).

Both Chou and Muller are dedicated to the pressing of microstructures. Applicant's claim seeks to improve on the invention of Chou by the addition of a heat transmission barrier. This is a known technique according to the teachings of Muller. The technique would be applicable to a thermoforming operation suggested by Chou. It would have been obvious to one having ordinary skill in the art at the time of the invention to include the heat barrier of Muller in the invention of Chou. One would be so motivated by a desire to perform a thermoforming operation in the invention of Chou and restrict heat transfer to the neighboring components of the apparatus. The addition of the heat transmission barrier into the invention of Chou amounts to the application of a known technique to a known art ready for such an improvement.

Claim 16:

This feature can be seen in Chou figure 9.

Claim 18:

This feature can be seen in Chou figure 9.

Claim 19:

Chou teaches a predetermined temperature in claim 3.

Claim 21:

Chou teaches a temperature of 200 degrees C (column 4 lines 63-66). Either Chou measures this temperature directly, which would involve the use of a temperature sensor, or it would have been obvious to one having ordinary skill in the art at the time

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of the invention to use a temperature sensor to make sure that the temperature is indeed in the desired operating range.

Claim 22:

Chou teaches a predetermined pressure (column 5 lines 7-10). Either Chou measures the pressure directly, which would involve the use of a pressure sensor, or it would have been obvious to one having ordinary skill in the art at the time of the invention to use a pressure sensor motivated by a desire to keep the pressure in operating range.

Claim 23:

Chou teaches that the controller takes charge of the x-y and z positioning (column 6 lines 36-38). If the controller controls the imprinting of the mold onto the film, (column 6 lines 41-44), and Chou teaches a desired pressure, the controller inherently causes the pressing means to establish the given pressure between the stamps and the object.

Claim 24:

This is so (Chou, abstract).

Claim 26:

The pressing means is arranged as a mechanically operating means.

Claim 27:

Chou teaches the use of metal (column 4 lines 43-46).

Claim 29:

Chou does not teach a second stamp with a second pattern. Chou also does not teach pressing the second stamp. The apparatus of Dimitracopoulos has a second stamp and is adapted to imprint a second pattern in the surface of the object; the pressing means

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is further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction (figure 3, ...pair of matching dies, column 4 lines 10-19..two sided pattern, claim1). It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Chou as Dimitracopoulos. This amounts to the combining of prior art elements according to known methods.

Claim 30:

The combined invention addresses this aspect of applicant's claim. Figure 11 of Dimitracopoulos shows the contacting means carrying the first stamp connected to a rail on a stationery support. In order to press, the contacting means must slide along the rail in the pressing direction.

3. Claims 15, 16, 18, 19, 21, 22, 23, 24, 26, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over 5,772,905 (Chou) in view of US 5,993,189 (Mueller) and US 2003/0189273 (Olsson).

The combination of Chou and Muller teach the characteristics of applicant's claims previously mentioned. Chou does not teach a second stamp adapted to imprint a second pattern in the second surface of the object, and the pressing means further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction. Such can be seen in Olsson figure 8. Both Olsson and the combined invention are dedicated to imprinting operations on the micrometer scale. The specific elements of the two inventions, the platens, the stamps, and the patterns, are all known. The difference between the inventions is that Chou provides one pattern

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while Olsson provides two. This being the case, all that would have to be done is to place a pattern on both stamps of Chou. This was performed by Olsson. When the inventions are combined, the result is predictable: a two-sided pattern will be produced onto the product. It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Chou as Olsson. This amounts to the combining of prior art elements according to known methods.

Claim 16:

This feature can be seen in Chou figure 9.

Claim 18:

This feature can be seen in Chou figure 9.

Claim 19:

Chou teaches a predetermined temperature in claim 3.

Claim 21:

Chou teaches a temperature of 200 degrees C (column 4 lines 63-66). Either Chou measures this temperature directly, which would involve the use of a temperature sensor, or it would have been obvious to one having ordinary skill in the art at the time of the invention to use a temperature sensor to make sure that the temperature is indeed in the desired operating range.

Claim 22:

Chou teaches a predetermined pressure (column 5 lines 7-10). Either Chou measures the pressure directly, which would involve the use of a pressure sensor, or it would have

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been obvious to one having ordinary skill in the art at the time of the invention to use a pressure sensor motivated by a desire to keep the pressure in operating range.

Claim 23:

Chou teaches that the controller takes charge of the x-y and z positioning (column 6 lines 36-38). If the controller controls the imprinting of the mold onto the film, (column 6 lines 41-44), and Chou teaches a desired pressure, the controller inherently causes the pressing means to establish the given pressure between the stamps and the object.

Claim 24:

This is so (Chou, abstract).

Claim 26:

The pressing means is arranged as a mechanically operating means.

Claim 27:

Chou teaches the use of metal (column 4 lines 43-46).

Claim 29:

Chou does not teach a second stamp with a second pattern. Chou also does not teach pressing the second stamp. The apparatus of Olsson has a second stamp and is adapted to imprint a second pattern in the surface of the object; the pressing means is further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction (figure 8). It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Chou as Olsson. This amounts to the combining of prior art elements according to known methods.

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4. Claims 15, 16, 18, 22, 23, 24, 26, 27, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,758,664 (Curtiss) in view of US 3,502,761 (Dimitracopoulos), and US 5,993,189 (Mueller).

Claim 15:

Curtiss teaches a device for transferring a pattern (abstract) of micro- and nanostructures (column 3 lines 41-44) to an object. Every object has a first and second surface. Curtiss teaches a first contacting means having a first stamp adapted to imprint a first pattern in the first surface of the object, and a pressing means adapted to press the first stamp into contact with the first surface of the object in a pressing direction (column 4 lines 10-12, 15-17, 31-38). Curtiss teaches an alignment means arranged in connection with the first contacting means for controlling the motion of the first stamp in a direction perpendicular to the pressing direction (column 2 lines 32-35, figure 1B element 114). Curtiss teaches a second contacting means. (figure 1B element 108) Curtiss does not teach a second stamp adapted to imprint a second pattern in the second surface of the object. Dimitracopoulos teaches a method of forming microstructures into an object (column 1 lines 35-40, column 2 lines 32-44, column 3 lines 44-48) . the apparatus of Dimitracopoulos has a second stamp and is adapted to imprint a second pattern in the surface of the object; the pressing means is further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction (figure 3, ...pair of matching dies, column 4 lines 10-19..two sided pattern, claim1). Both Curtiss and Dimitracopoulos teach a pressing operation which presses a pattern of microstructures into a product. The specific elements of the two

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inventions, the platens, the stamps, and the patterns, are all known. The difference between the inventions is that Curtiss provides one pattern while Dimitracopoulos provides two. The stamps of Curtiss are taught to be reversible (column 4 lines 14-16). This being the case, all that would have to be done is to place a pattern on both stamps of Curtiss. This was performed by Dimitracopoulos. When the inventions are combined, the result is predictable: a two-sided pattern will be produced onto the product. It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Curtiss as Dimitracopoulos. This amounts to the combining of prior art elements according to known methods.

Curtiss does not teach a heat transmission barrier. Curtiss does not teach away from the use of heat, rather Curtiss seeks to improve on the known thermoforming processes by adding an alignment device (column 2 lines 1-4). Known in the art for forming CD type discs is the use of a thermoforming process involving hot stampers (column 1 lines 52-64). Curtiss teaches the use of a deformable polymer coating (column 3 lines 53-60) normally deformed by the application of heat. Muller teaches a pressing device adapted to press a pattern of microstructures on a substrate (column 2 lines 16-21). Muller also teaches the use of a heat transmission barrier (column 2 lines 10-15). Muller includes the heat transmission barrier in order to restrict heat transfer to the neighboring components of the apparatus (column 3 lines 7-13). Both Curtiss and Muller are dedicated to the pressing of microstructures. Applicant's claim seeks to improve on the invention of Curtiss by the addition of a heat transmission barrier. This is a known technique according to the teachings of Muller. The technique would be applicable to a

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thermoforming operation suggested by Curtiss. It would have been obvious to one having ordinary skill in the art at the time of the invention to include the heat barrier of Muller in the invention of Curtiss. One would be so motivated by a desire to perform a thermoforming operation in the invention of Curtiss and restrict heat transfer to the neighboring components of the apparatus. The addition of the heat transmission barrier into the invention of Curtiss amounts to the application of a known technique to a known art ready for such an improvement.

Claim 16:

The alignment means of Curtiss is in connection with the first contacting means (figure 1A)

Claim 18:

Figure 1A of Curtiss and figures 3 and 11 of Dimitracopoulos demonstrate contacting means which are substantially identical.

Claims 22 and 23:

Curtiss teaches the use of a predetermined pressure in claim 5. In order to measure such a pressure or practice the claimed invention, a pressure sensor would be needed.

It would have been obvious to one having ordinary skill in the art at the time of the invention to include a sensor as this is needed to practice the invention of Curtiss claim 5. In order to produce or maintain the predetermined pressure, there must be some control unit else it would have been obvious to include one motivated also by a desire to practice the invention of Curtiss claim 5.

Claim 24:

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The stamps have such patterns.

Claim 26:

The pressing means of the combined invention is mechanically operated.

Claim 27:

Curtiss teaches the use of metal (column 4 lines 24-26).

Claim 29:

According to the combined invention:

- a) a pattern of micro structures is transferred to an object.
- b) every object has at least two surfaces
- c) the object to be stamped is indeed placed between the stampers.
- d) there are two different patterns used for the stamps of the combined invention.
- e) the stamps are pressed together
- f) Curtiss teaches that one or both stamps are movable
- g) the alignment tool of Curtiss controls the motion of the stamp in such a direction
- h) the heat transmission barrier of the combined invention minimizes heat transfer.

Claim 30:

The combined invention addresses this aspect of applicant's claim. Figure 11 of Dimitracopoulos shows the contacting means carrying the first stamp connected to a rail on a stationery support. In order to press, the contacting means must slide along the rail in the pressing direction.

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5. Claims 15, 16, 18, 22, 23, 24, 26, 27, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,758,664 (Curtiss) in view of US 2003/0189273 (Olsson), and US 5,993,189 (Mueller).

Claim 15:

Curtiss teaches a device for transferring a pattern (abstract) of micro- and nanostructures (column 3 lines 41-44) to an object. Every object has a first and second surface. Curtiss teaches a first contacting means having a first stamp adapted to imprint a first pattern in the first surface of the object, and a pressing means adapted to press the first stamp into contact with the first surface of the object in a pressing direction (column 4 lines 10-12, 15-17, 31-38). Curtiss teaches an alignment means arranged in connection with the first contacting means for controlling the motion of the first stamp in a direction perpendicular to the pressing direction (column 2 lines 32-35, figure 1B element 114). Curtiss teaches a second contacting means. (figure 1B element 108) Curtiss does not teach a second stamp adapted to imprint a second pattern in the second surface of the object, and the pressing means further adapted to press the second stamp into contact with the second surface of the object parallel to the pressing direction. Such can be seen in Olsson figure 8. Both Olsson and the combined invention are dedicated to imprinting operations on the micrometer scale. The specific elements of the two inventions, the platens, the stamps, and the patterns, are all known. The difference between the inventions is that Curtiss provides one pattern while Olsson provides two. This being the case, all that would have to be done is to place a pattern on both stamps of Curtiss. This was performed by Olsson. When the inventions are

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combined, the result is predictable: a two-sided pattern will be produced onto the product. It would have been obvious to one having ordinary skill in the art at the time of the invention to use two patterns in the invention of Curtiss as Olsson. This amounts to the combining of prior art elements according to known methods.

Curtiss does not teach a heat transmission barrier. Curtiss does not teach away from the use of heat, rather Curtiss seeks to improve on the known thermoforming processes by adding an alignment device (column 2 lines 1-4). Known in the art for forming CD type discs is the use of a thermoforming process involving hot stampers (column 1 lines 52-64). Curtiss teaches the use of a deformable polymer coating (column 3 lines 53-60) normally deformed by the application of heat. Muller teaches a pressing device adapted to press a pattern of microstructures on a substrate (column 2 lines 16-21). Muller also teaches the use of a heat transmission barrier (column 2 lines 10-15). Muller includes the heat transmission barrier in order to restrict heat transfer to the neighboring components of the apparatus (column 3 lines 7-13). Both Curtiss and Muller are dedicated to the pressing of microstructures. Applicant's claim seeks to improve on the invention of Curtiss by the addition of a heat transmission barrier. This is a known technique according to the teachings of Muller. The technique would be applicable to a thermoforming operation suggested by Curtiss. It would have been obvious to one having ordinary skill in the art at the time of the invention to include the heat barrier of Muller in the invention of Curtiss. One would be so motivated by a desire to perform a thermoforming operation in the invention of Curtiss and restrict heat transfer to the neighboring components of the apparatus. The addition of the heat transmission barrier

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into the invention of Curtiss amounts to the application of a known technique to a known art ready for such an improvement.

Claim 16:

The alignment means of Curtiss is in connection with the first contacting means (figure 1A)

Claim 18:

Figure 1A of Curtiss and figure 8 of Olsson demonstrate contacting means which are substantially identical.

Claims 22 and 23:

Curtiss teaches the use of a predetermined pressure in claim 5. In order to measure such a pressure or practice the claimed invention, a pressure sensor would be needed.

It would have been obvious to one having ordinary skill in the art at the time of the invention to include a sensor as this is needed to practice the invention of Curtiss claim 5. In order to produce or maintain the predetermined pressure, there must be some control unit else it would have been obvious to include one motivated also by a desire to practice the invention of Curtiss claim 5.

Claim 24:

The stamps have such patterns.

Claim 26:

The pressing means of the combined invention is mechanically operated.

Claim 27:

Curtiss teaches the use of metal (column 4 lines 24-26).

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Claim 29:

According to the combined invention:

- a) a pattern of micro structures is transferred to an object.
- b) every object has at least two surfaces
- c) the object to be stamped is indeed placed between the stampers.
- d) there are two different patterns used for the stamps of the combined invention.
- e) the stamps are pressed together
- f) Curtiss teaches that one or both stamps are movable
- g) the alignment tool of Curtiss controls the motion of the stamp in such a direction
- h) the heat transmission barrier of the combined invention minimizes heat transfer.

6. Claims 20, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,772,905 (Chou) in view of US 3,502,761 (Dimitracopoulos), and US 5,993,189 (Mueller) in further view of US 6,766,999 (Hosoe).

Claims 20, 31 and 32 are also rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,772,905 (Chou) in view of US 2003/0189273 (Olsson) and US 5,993,189 (Mueller) in further view of US 6,766,999 (Hosoe).

Claims 19-21, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,758,664 (Curtiss) in view of US 3,502,761 (Dimitracopoulos), and US 5,993,189 (Mueller) in further view of US 6,766,999 (Hosoe).

Claims 19-21, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,758,664 (Curtiss) in view of US 2003/0189273 (Olsson) and US 5,993,189 (Mueller) in further view of US 6,766,999 (Hosoe).

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The combined inventions teaches the characteristics previously described but do not teach that the heating means may heat the object receiving the pattern to a temperature of 500 degrees C. Hosoe teaches a method of manufacturing an optical element (column 1 lines 6-10), such an optical elements have nanoscale resolutions (column 2 lines 20-25). The meduim used by Hosoe is an amorphous alloy which has a softening temperature near 500 degrees C. Hosoe teaches that such an alloy can easily be press formed (column 1 lines 18-25). Both Hosoe and the combined inventions are dedicated to the formation of micro-scale patterns and also dedicated to the formation of optical media. If the polymer material of the combined inventions were substituted for the alloy material in Hosoe, higher temperatures would be needed for such a thermoforming operation. It would have been obvious to one having ordinary skill in the art at the time of the invention to: (claim 19) use a heating means arranged to heat the object to a predetermined temperature; (claim 20), heat the object receiving the pattern to a temperature of up to 500 degrees C; (claim 31) adapt the heating means to heat at a temperature in a range from between 250 and 350 degrees C; (claim 32) adapt the heating means for heating at a temperature of between 280 and 320 degrees C.

Claim 21:

The combined methods do, in fact, mention desirable temperatures (Hosoe column 1 lines 18-24). Therefore one having ordinary skill in the art would need to know the temperature of the object during the pressing operation. It would have been obvious to one having ordinary skill in the art at the time of the invention to include a temperature sensor for this purpose.

Response to Arguments

7. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: Although the prior art methods possess an alignment means with an arm protruding from the first contacting means to a rail on a stationary support, the arm is not adapted to slide in the pressing direction on the rail.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID N. BROWN II whose telephone number is (571)270-5497. The examiner can normally be reached on Monday-Thursday 7:30a-5:00p EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Del Sole can be reached on (571)-272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID N. BROWN II/
Examiner, Art Unit 1791

/Joseph S. Del Sole/
Supervisory Patent Examiner, Art Unit 1791